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ABSTRACT

Project Computer-Assisted Instructional Management (C-AIM) is being pilot tested on third grade mathematics students in the Jonesboro Public schools (Jonesboro, Arkansas). Each elementary building operates a MUPET Lab equipped with at least six Commodore Model 4016/4032 microcomputers, one Commodore Model 4040 dual disc drive, and one Commodore Model 4022 printer. These components are networked into a single system using the MUPET, an IEEE multiplexer allowing the microcomputers common access to the IEEE peripherals. If all machines are not required for test administration they may be used in the classroom for computer-assisted instruction. The intent of C-AIM is to provide a model by which microcomputers may be used to assist in the management of instruction by providing an interactive system for evaluating student progress on a predetermined set of objectives and providing immediate flexible access to the evaluations. The design includes having the microcomputing system available on demand to do testing with the capability of handling multiple user access to the dual disc drive and printer. A test exists for each unit of material in the system. A unit may contain from 5 to 10 objectives. Each unit test has four randomly-generated test items for each objective of that unit. (PN)

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THE MUPET LAB
Computer Assisted Management of Instruction

While computers have become fairly common in CAI situations in elementary schools, their use in assisting with instructional management and assessment has been limited. Project C-AIM, C-AIM is an acronym for Computer Assisted Instructional Management, is an effort to develop a suitable model for instructional management. C-AIM has been funded by the Arkansas State Department of Education and is being piloted on third grade mathematics students in the Jonesboro Public Schools, Jonesboro, Arkansas. The intent of C-AIM is to provide a model by which microcomputers may be used to assist in the management of instruction by providing an interactive system for evaluating student progress on a predetermined set of objectives and providing immediate flexible access to the evaluations. The design includes having the microcomputing system available on demand to do testing with the capability of handling multiple user access to a dual disc drive and printer. A test exists for each unit of material in the system. A unit may contain from 5 - 10 objectives. Each unit test has four randomly generated test items for each objective in that unit.

The MUPET Lab

Each elementary building operates a MUPET Lab equipped with at least six Commodore 4016/4032 microcomputers, one Commodore Model 4040 dual disc drive, and one Commodore Model 4022 printer. These components are networked into a single system using the MUPET, an IEEE multiplexer

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allowing the microcomputers common access to the IEEE peripherals. This particular networking does not require the dedication of any of the microcomputers to assist the networking since the disc drive contains its own 6502 chip. Removal of one or more of the microcomputers from the network in no way interrupts the system and, consequently, if all machines are not required for test administration then they may be removed from the Lab and used in the classroom for CAI.

Software

The C-AIM system uses a relative file on a preformatted diskette to maintain records on individual students. This diskette can maintain up to 949 student records. Each record is 175 bytes long and can keep track of a student's progress on 427 predetermined objectives. The student record contains character fields for the student name, teacher name, sex, date of birth (age), grade/level, and standardized test scores in mathematics (grades k - 8). The record also contains data pertaining to the student's testing activities, such as date of last access to tests, the number of the unit test which was taken during the last access, the amount of user time during the last test, the number of the last test which the student passed (80+%) the total amount of student use time in testing and the unit test which will be given next. Several pointer fields are maintained to help decrease access time in the file. (See figure 1)

The student data file also contains a list of teacher names, the name of the school system, and an eight character code which is used to prevent student access of the management program. These are stored at the end of the data file. The first record of the data file is an especially designated record which keeps pointers to the lists in the

student file. These lists consist of a group of student records who all have a common teacher or a common grade level. The first record also contains the current date. (See figure 2)

C-AIM operates with two disks at a time. One disk contains the data file and the other contains the management and testing programs. The management programs are used to enter, manipulate, print and delete data from the student data file diskette.

Management Operations

Two of the management programs are used to help the teacher in initializing the system each day (System Boot) and to assist the teacher in performing operations (Control Menu). The programs accessed by Control Menu are:

1. ENTER NEW STUDENT
2. DELETE OR CHANGE RECORDS
3. DELETE OR CHANGE LISTS
4. GENERAL LISTINGS
5. TEACHER LISTINGS
6. REVIEW STUDENT RECORD
7. TESTING
8. END

The first three operate as you would expect. The lists available under General Listings include all teachers on file, all students on file by grade level, an overall list of students, and a list of all students by teacher. The second group of listings include lists of students under a user selected teacher. These lists may be by unit, by objectives mastered, by date of last access, or by standardized test score.

The option 'Review Student Record' allows the teacher to review all the record for a specified student. As the computer gives the test items, it keeps track of the objectives successfully completed by the student. Thus, in addition to the base data and the standardized test scores, the teacher may review all objectives from one or more units. The review may be done to the screen for fast access or a

printout of the student record may be requested. These student record printouts have proved very helpful in parent/teacher conferences.

Testing Operations

One of C-AIM's basic purposes is to test the students on the specified objectives. The unit tests are designed to test the student on a group of Basic Skills Objectives. The eighteen unit tests used here cover a set of 150 mathematics objectives for grades K - 4. The testing option contains two main parts.

(1) Testing Manager. Once the testing mode is chosen, then the user may not return to 'Control Menu' unless they know the control code. This feature allows the student operator to take a test with minimal supervision. The Run/Stop key, which usually aborts the program, is disabled in the TESTING MANAGER and in the unit tests to prevent the students from inadvertently stopping the program.

(2) Individual Tests. There are 18 tests in this system. In each test a score of 75+ percent on a specific objective is needed to successfully complete that objective. A score of 80+ percent of objectives successfully completed is needed to pass a unit. If the unit is passed, then the system automatically bumps the students current unit field to the next sequential unit. When a test is finished, control is returned to the TESTING MANAGER. The TESTING MANAGER records the necessary information on the student data file diskette and then gets ready for the next student.

Only a user that knows the control code may return the microcomputer from testing mode back to the CONTROL MENU. The teacher may at any time override the sequential move that takes place when a student passes a unit test and may change the student's current status to any desired unit. In this way the teacher maintains the ultimate control over the scope and sequence of the testing program.

Student-Teacher Reaction

The response to the C-AIM system by both students and teachers has been very positive. The most remarkable observation has been the motivational effect that using the system has had on the students. The equipment is available for instructional use when not in testing mode but the students are also intrinsically motivated to complete units of material in order to get to take a unit test. They seem to find no threat in being tested by the computer (in fact 'test' has become a friendly word in their vocabulary) and they enjoy the time spent in testing even though they find it challenging. The students seem to find satisfaction in completing certain objectives from a unit whether or not they pass the whole unit. They are, however, very pleased to pass a unit.

The teachers have found the accessibility of information relative to student performance to be very worthwhile. It has allowed the teachers to modify instructional time in order to make sure that students don't have gaps in their background. The instructional time has become more directed and it would seem that the students are achieving a more solid foundation in mathematics. The possible effects will continue to be monitored but we are at this point very optimistic of the impact on learning of systems such as C-AIM.